Sea level rise at the site scale in the NY-NJ Harbor Estuary

Kate Boicourt (NY-NJ Harbor & Estuary Program)

Photos of an average high tide and King Tide at Donaldson Park in Highland Park, NJ (Matthew Bradley/Middlesex County)

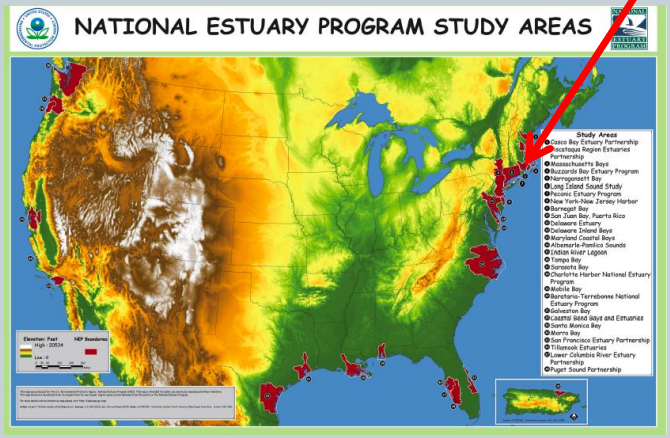
Presentation overview

- Who is the NY-NJ Harbor & Estuary Program?
- Sea level rise and climate change
- Case studies in sea level rise planning: public access in the Raritan River
- Next steps for sea level rise preparedness?
- Hurricane Sandy

NY-NJ Harbor & Estuary Program

A bi-state conference of State, Federal, NGO, and interested public focused on:

- clean water,
- productive habitats
- managing sediments
- fostering community stewardship
- educating the public
- improving safe access to our waterways.



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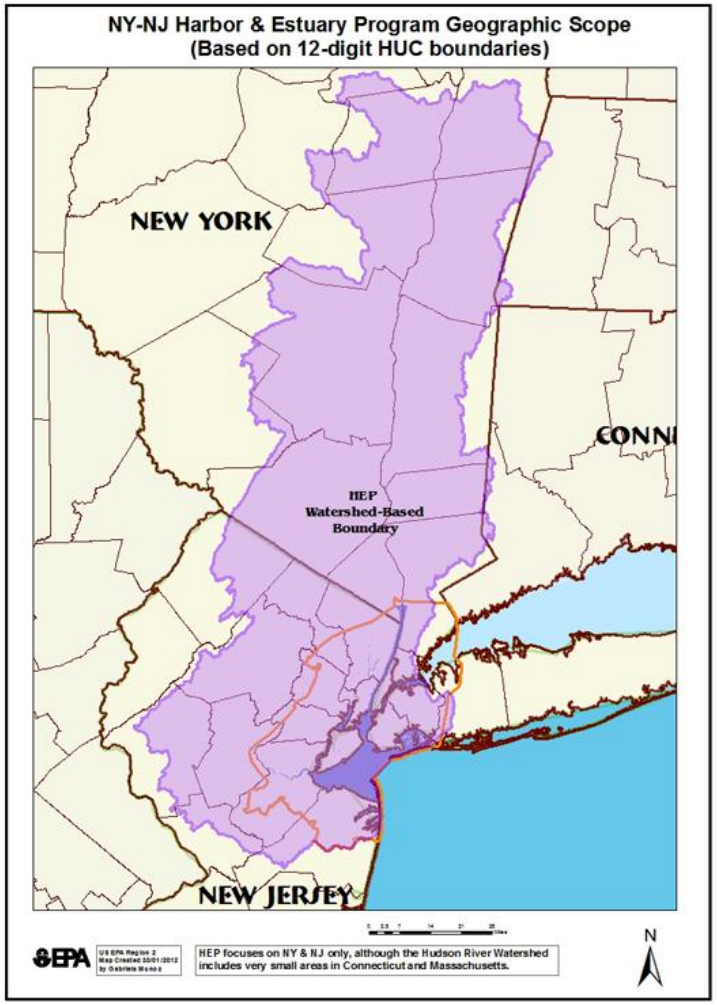
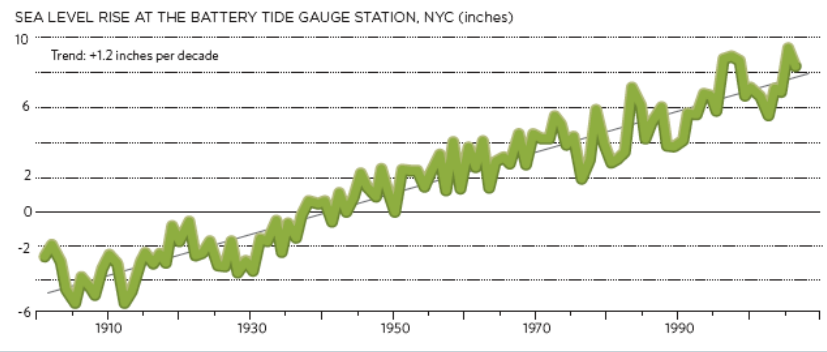
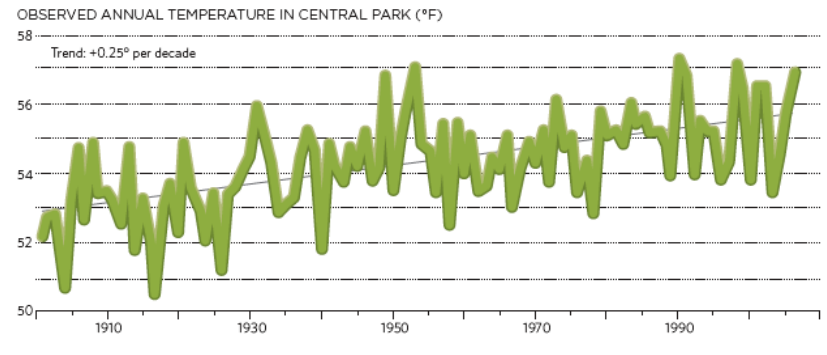
NY-NJ Harbor Estuary Geographic Scope

- Hudson River watershed up to the Troy Dam
- Raritan watershed
- Passaic watershed
- Hackensack river watershed
- Jamaica Bay



Sea level is rising, temperatures are warming





Observed sea level rise and temperature since 1900

Baseline Climate and Mean Annual Changes Relative to Baseline Years[1]

Full range of changes in mean annual changes: Min (Central Range) Max

	Baseline 1971-2000	2020s	2050s	2080s
Air temperature Central range[2]	55°F	+ 0.5 (1.5 to 3) 3.5° F	+ 2.5 (3 to 5) 7.5° F	+ 3 (4 to 7.5) 10° F
Precipitation Central range[2]	46.5 in	- 5 (0 to 5) 10 %	-10 (0 to 10) 10 %	-10 (5 to 10) 15 %
Sea level rise[3] Central range[2]	NA	+ 1 (2 to 5) 6 in	+ 5 (7 to 12) 14 in	+ 9 (12 to 23) 26 in

Source: Columbia University Center for Climate Systems Research

[1] Based on 16 GCMs (7 GCMs for sea level rise) and 3 emissions scenarios. Baseline is 1971-2000 of temperature and precipitation, and 2000-2004 for sea level rise. Data from National Weather Service (NWS) and National Oceanic and Atmospheric Administration (NOAA). Temperature data are from Central Park; precipitation data are the mean of the Central Park and La Guardia Airport values; and sea level data are from the Battery at the southern tip of Manhattan (the only location in NYC for which comprehensive historic sea level rise data are available).

[2] Minimum, central 67% range, and maximum values from model-based probabilities; temperatures ranges are rounded to the nearest half-degree, precipitation to the nearest 5%, and sea level rise to the nearest inch.

[3] The model-based sea level rise projections may represent the range of possible outcomes less completely than the temperature and precipitation projections.

Projected sea level rise, temperature, and precipitation through the 2080s

Pilot projects and case studies in New Jersey

North Hudson Sewerage Authority

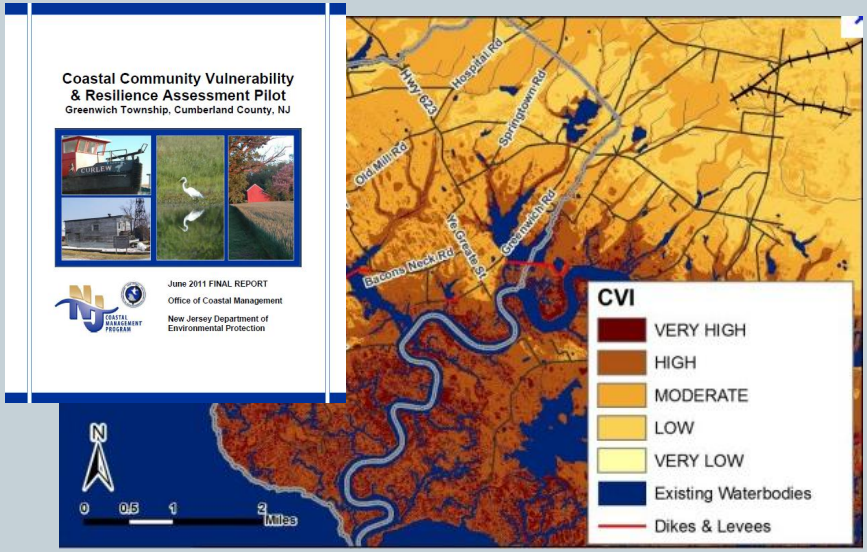
Climate-Ready Water Utilities
http://water.epa.gov/infrastructure/watersecurity/climate/

Mike Fedosh

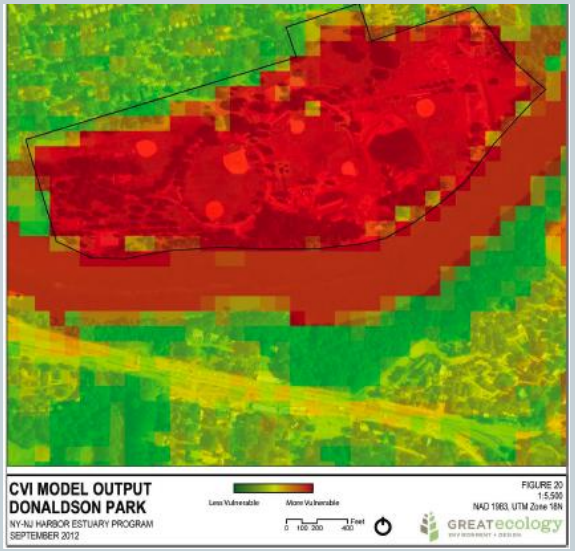
Case Studies in Sea Level Rise Planning: Public Access in the NY-NJ Harbor Estuary

Case studies in sea level rise planning: public access in the NY-NJ Harbor Estuary

- Many good examples of large-scale scenario planning, such as Coastal Climate Vulnerability Analysis Protocol (NJDEP)
- This study focused on the site scale: given sea level rise, what should one consider at a specific location.



Coastal Climate Vulnerability Assessment Protocol (NJDEP)



Fine Scale Coastal Vulnerability Index (Great Ecology)

Public access in Middlesex County

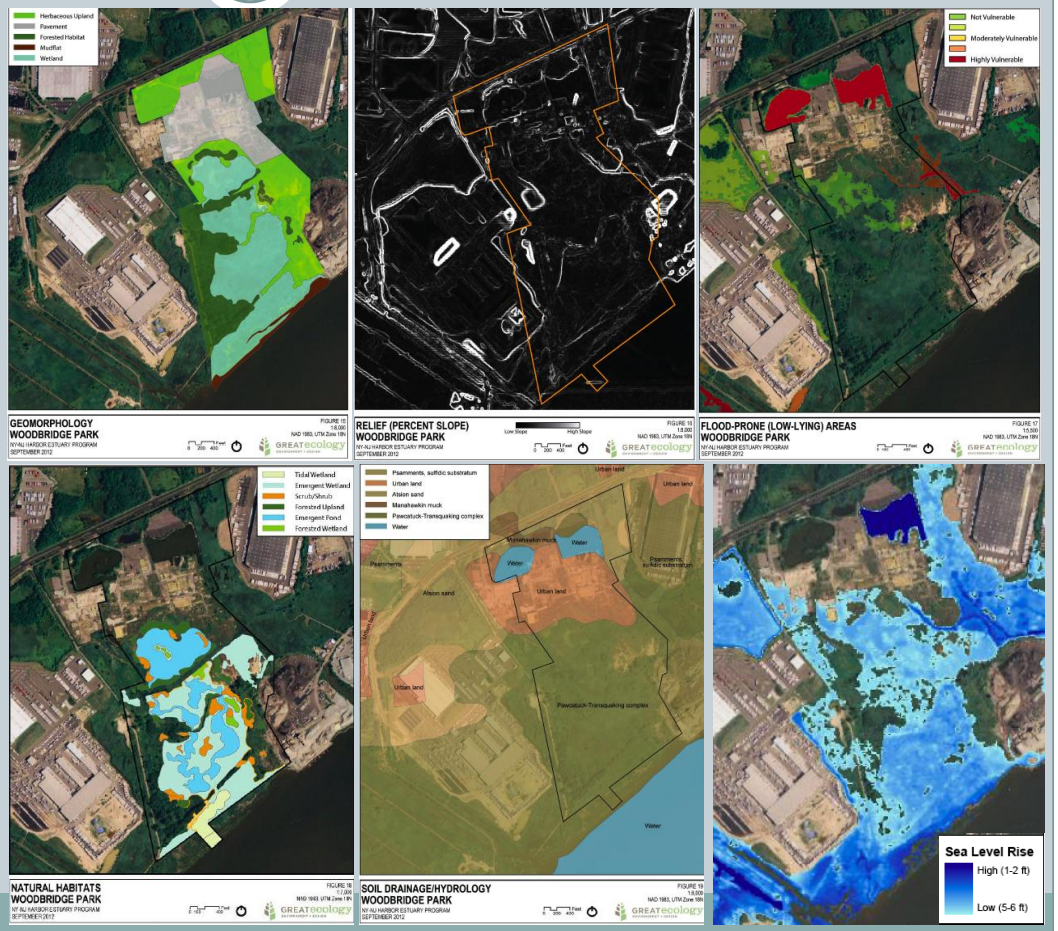
Lower Raritan Initiative (Association of NJ Environmental Commissions)

Hudson-Raritan Estuary Comprehensive Restoration Plan (www.watersweshare.org)

Study region and sites

Vulnerability index background

- Geomorphology
- % Slope
- Flood-prone areas
- Extent of natural habitats
- Soil drainage
- Sea level rise



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Site-specific vulnerability: Donaldson Park

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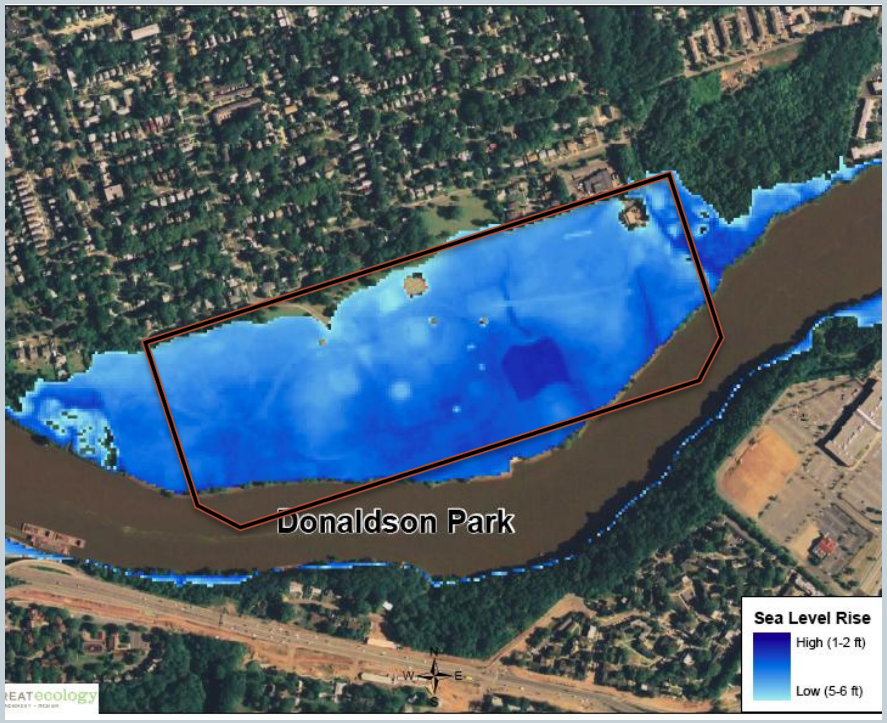

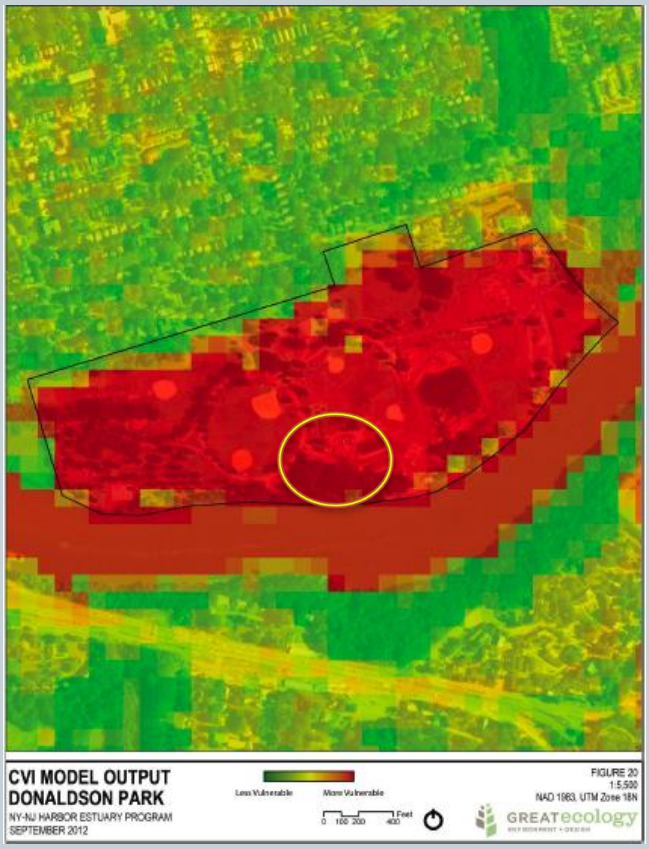

Site-specific vulnerability: Woodbridge

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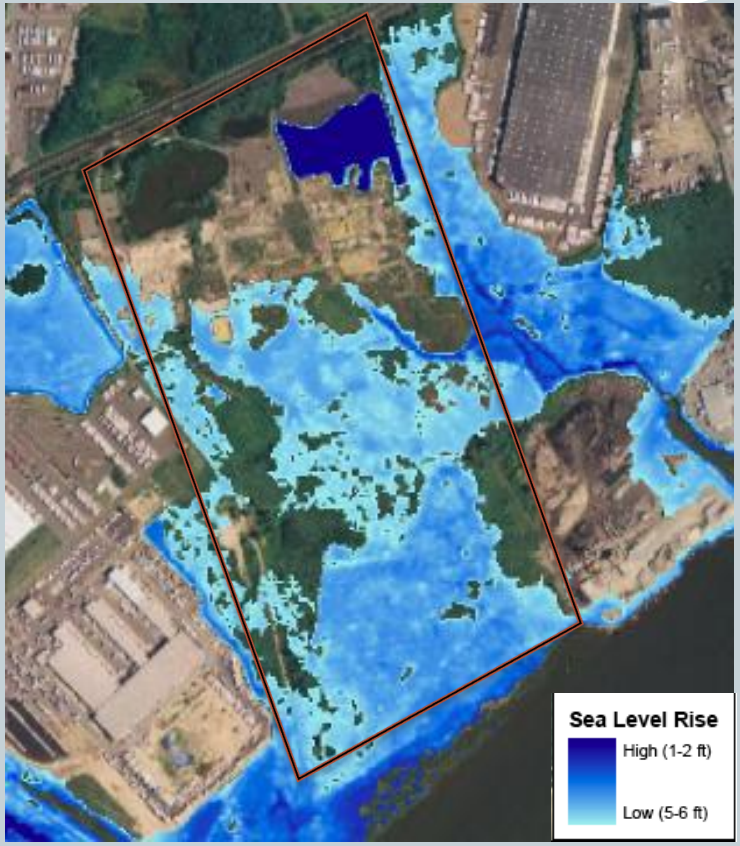
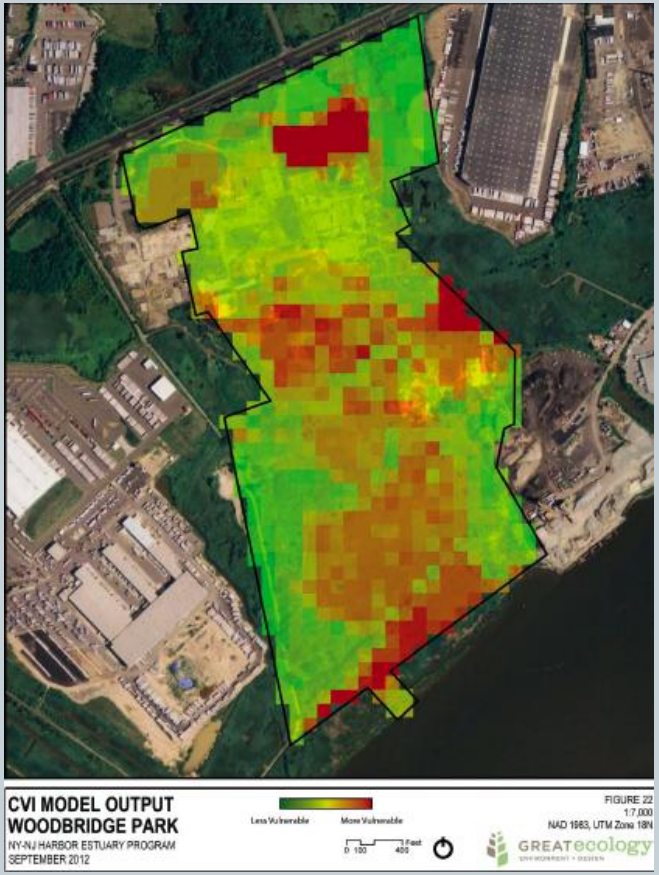
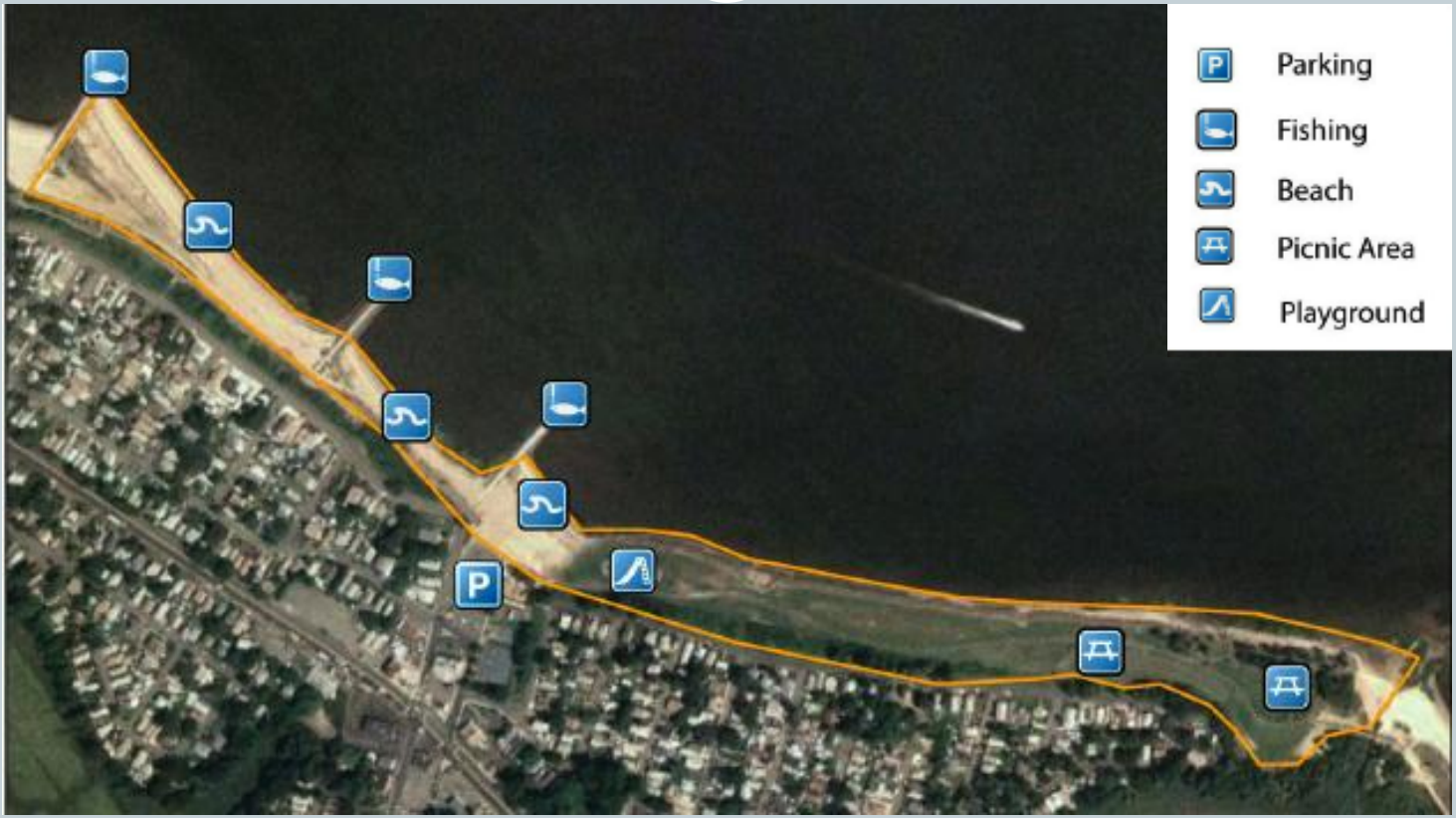




Site-specific vulnerability: Old Bridge Waterfront



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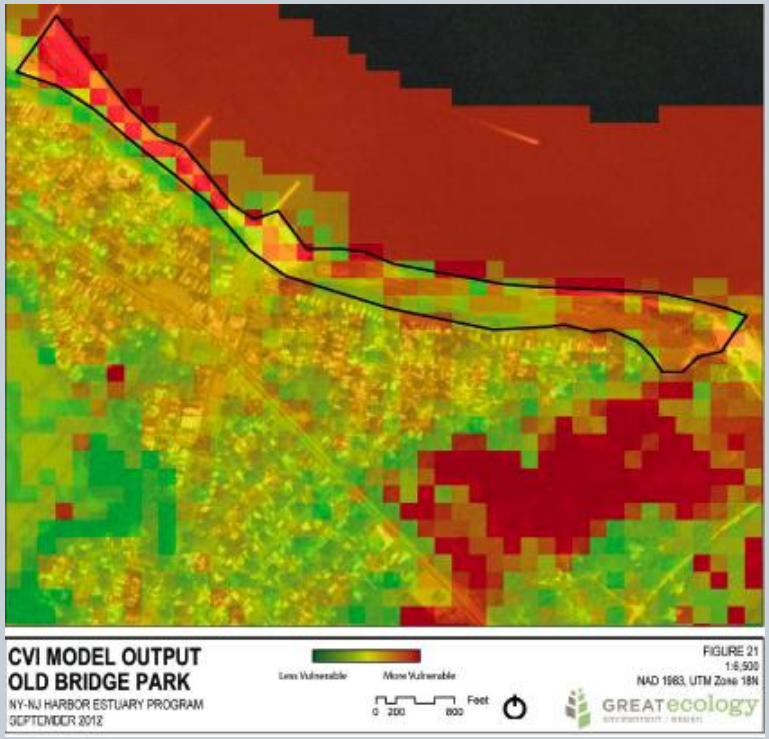
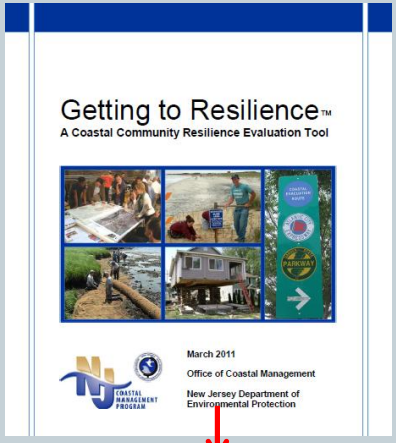


Hurricane Sandy

Future investigations and actions

- Guidance for the site scale
- Integration into NOAA's impacts viewer
- Further outreach and informational materials – marinas, landowners, public works



Site-scale guide?